Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (**Currently Amended**) A genetically modified plant, comprising one or more than one copy of at least two different sequences encoding two different eukaryotic P_{1B}-type ATPase of the $Zn^{2+}/Co^{2+}/Cd^{2+}/Pb^{2+}$ subclass and that ~~they~~ it overexpresses said two different P_{1B}-type ATPase and wherein said genetically modified plant is able to accumulate the heavy metals Zn, Co, Cd or Pb and translocate them to the shoots.

2. (**Currently Amended**) The genetically modified ~~plants~~ plant according to claim 1, wherein said P_{1B}-type ATPase is selected from the group consisting of heavy metal ATPase HMA1, HMA2, HMA3 and HMA4 of *Arabidopsis thaliana*.

3. (**Cancelled**)

4. (**Currently Amended**) The genetically modified ~~plants~~ plant according to claim 1, wherein the genetically modified plant further includes one or more than one copy of a sequence selected among sequences encoding (1) an enzyme involved in metal chelation and (2) another metal transporter.

5. (**Previously Presented**) A recombinant vector able to transform plants, wherein said vector includes one or more than one copy of at least two different sequences encoding two different eukaryotic P_{1B}-type ATPase of the $Zn^{2+}/Co^{2+}/Cd^{2+}/Pb^{2+}$ subclass.

6. (**Previously Presented**) The recombinant vector according to claim 5, wherein said coding sequences are operably linked to and under the regulatory control of a plant-expressible transcription and translation regulatory sequence.

7. (**Currently Amended**) A genetically modified ~~plants~~ plant, that has been transformed with a recombinant vector

according to claim 5.

8. (**Previously Presented**) Plant cells transformed with a recombinant vector according to claim 5.

9. (**Currently Amended**) A method of producing a genetically modified ~~plants~~ plant according to claim 1 which overexpresses at least two different eukaryotic P_{1B}-type ATPase of the $Zn^{2+}/Co^{2+}/Cd^{2+}/Pb^{2+}$ subclass and is able to accumulate the heavy metals Zn, Co, Cd or Pb and translocate them to the shoots, said method comprising:

- ~~preparing~~ providing a recombinant vector ~~according to claims 5,~~ able to transform plants and comprising one or more than one copy of at least two different sequences encoding two different eukaryotic ~~a~~ P_{1B}-type ATPase of the $Zn^{2+}/Co^{2+}/Cd^{2+}/Pb^{2+}$ subclass, operably linked to and under the regulatory control of a ~~plante~~ plant-expressible transcription and translation regulatory sequence and

- introducing said ~~recominant~~ recombinant vector into a plant cell or plant tissue it is capable of transforming to produce a genetically modified plant cell or a genetically modified plant tissue.

10. (**Currently Amended**) A method of phytoremediation of heavy metals from soil, comprising ~~characterized in that it includes~~:

- planting genetically modified plants according to claim 1, in an area containing soil contaminated with at least one heavy metal and

- collecting and removing plant tissues from said genetically modified plants at appropriate time intervals.

11. (**Previously Presented**) The method of phytoremediation according to claim 10, wherein Zn, Co, Cd or Pb, is extracted from soil.

12. (**Previously Presented**) The method of phytoremediation according to claim 10, wherein the entire plant is removed after it is allowed to grow on metal-containing soil

incorporating those metals into its tissues.

13. (**Previously Presented**) The method of phytoremediation according to claim 10, wherein at appropriate time intervals, the metal containing tissues are removed from the plant, allowing the remaining plant tissues to survive.

14. (**Previously Presented**) The method of phytoremediation according to claim 13, wherein the collected plant tissues are removed from the growing area and properly disposed, so that the metal containing tissues are not allowed to reassimilate in the soil.

15. (**Previously Presented**) The method of phytoremediation according to claim 13, wherein said heavy metals may be extracted, in the M^{n+} state, from said plant tissues.

16. (**Previously Presented**) The method of phytoremediation according to claim 13, wherein said heavy metals are extracted from ashes obtained after having burnt the collected metal containing tissues, said metal being in the M^0 state.

17. (Previously Presented) A genetically modified plant, as defined in claim 1, wherein said plant is selected in the group consisting of *Brassica juncea*, *Poplar*, *Nicotiana tabacum*.

18. (**Previously Presented**) A method for phytoextracting Zn, Co, Cd or Pb, from a contaminated environment comprising planting a genetically modified plant according to claim 1.

19. (**Previously Presented**) A method for phytoextraction of Co, Cd or Pb, from a contaminated environment comprising planting a genetically modified plant according to claim 7 in the contaminated environment.

20. (**Currently Amended**) A method of producing a genetically modified plants according to claim 1, which ~~plants overexpress~~ plant overexpresses at least two different eukaryotic P_{1B}-type ATPase of the $Zn^{2+}/Co^{2+}/Cd^{2+}/Pb^{2+}$ subclass and is able to accumulate the heavy metals Zn, Co, Cd or Pb and translocate them to the shoots, said method comprising:

- ~~preparing~~ providing at least one recombinant vector(s) ~~according to claims 5 or 6,~~ able to transform plants and comprising one or more than one copy of at least two different sequences encoding two different eukaryotic P_{1B}-type ATPase of the $Zn^{2+}/Co^{2+}/Cd^{2+}/Pb^{2+}$ subclass, operably linked to and under the regulatory control of a ~~plante~~ plant-expressible transcription and translation regulatory sequence and

- introducing said at least one ~~recominant~~ recombinant vector(s) into a plant cell or plant tissue it is capable of transforming to produce a genetically modified plant cell or a genetically modified plant tissue.

21. (**Previously Presented**) A method of phytoremediation of heavy metals from soil, comprising:

- planting a genetically modified plant according to claim 1, in an area containing soil contaminated with at least one heavy metal and

- collecting and removing plant tissues from said genetically modified plant at appropriate time intervals.

22. (**Previously Presented**) The method of phytoremediation according to claim 21, wherein the method involves the extraction of at least one of Zn, Co, Cd and Pb, from soil.

23. (**Previously Presented**) The method of phytoremediation according to claim 21 wherein the entire plant is removed after it has been allowed to grow on metal-containing soil.

24. (**Previously Presented**) The method of phytoremediation according to claim 21, wherein at appropriate time intervals, metal containing tissues are removed from the plant, said plant being left alive.

25. (**Previously Presented**) The method of claim 24, wherein leaves and optionally branches of the plant are removed.

26. (**Previously Presented**) The method of

phytoremediation according to claim 24, wherein the collected plant tissues are removed from the growing area and properly disposed, so that the metal containing tissues are not allowed to reassimilate in the soil.

27. (**Previously Presented**) The method of phytoremediation according to claim 24, wherein said heavy metals are extracted, in the M^{n+} state, from said plant tissues.

28. (**Previously Presented**) The method of phytoremediation according to claim 24, wherein said heavy metals are extracted from ashes obtained after having burnt the collected metal containing tissues, said metal being in the M^0 state.

29. (**Currently Amended**) A genetically modified plant according to claim 1, ~~characterized in that~~ wherein said P_{1B}-type ATPase of the $Zn^{2+}/Co^{2+}/Cd^{2+}/Pb^{2+}$ subclass is from a higher plant.

30. (**Currently Amended**) A genetically modified plant according to claim 4, ~~characterized in that~~ wherein said enzyme involved in metal chelation is selected from the group consisting of phytochelatin synthase, glutathion synthetase and gamma-glutamylcystein synthase, and/or said metal transporter is selected from the group consisting of YCF1 and an ABC transporters.

31. (**Currently Amended**) A recombinant vector according to claim 6, ~~characterized in that~~ wherein said plant-translation regulatory sequence is a plant specific promoter.

32. (**Currently Amended**) The method according to claim 9, ~~characterized in that~~ wherein said enzyme involved in metal chelation is selected from the group consisting of phytochelatin synthase, glutathion synthetase and gamma-glutamylcystein synthase, and/or said metal transporter is selected from the group consisting of YCF1 and ABC transporters.

33. (**Currently Amended**) The method of claim 13, ~~characterized in that~~ wherein said tissues are leaves and/or branches.

34. (**Currently Amended**) The method according to claim 20, ~~characterized in that~~ wherein said enzyme involved in metal chelation is selected from the group consisting of phytochelatin synthase, glutathion synthetase and gamma-glutamylcystein synthase, and/or said metal transporter is selected from the group consisting of YCF1 and ABC transporters.

35. (**New**) The genetically modified plant according to claim 1, wherein one of said P_{1B}-type ATPase preferentially enhances translocation of heavy metals from the roots to the upper parts of the plant and another of said P_{1B}-type ATPase preferentially favours vacuolar sequestration of said heavy metals.

36. (**New**) The genetically modified plant according to claim 2, wherein said two P_{1B}-type ATPase are HMA3 and HMA4.

37. (**New**) The recombinant vector according to claim 5, wherein one of said P_{1B}-type ATPase preferentially enhances translocation of heavy metals from the roots to the upper parts of the plant and another of said P_{1B}-type ATPase preferentially favours vacuolar sequestration of said heavy metals.

38. (**New**) The method of claim 9, wherein said providing comprises preparing said vector.

39. (**New**) The method of claim 20, wherein said providing comprises preparing said vector.